



BUREAU OF INDIAN STANDARDS

AGENDA

13th MEETING OF CODING AND PROCESSING OF AUDIO, PICTURE, MULTIMEDIA AND HYPERMEDIA INFORMATION SECTIONAL COMMITTEE, LITD 23

(Hybrid Meeting)

| | |
|------------------------|---|
| Date & Time | 5 th December 2024 Time : 10:00 hrs |
| Venue | Blue Room, Manak Bhavan, Bureau of Indian Standards, 9, Bahadur Shah Zafar Marg, New Delhi – 110002., Delhi, India |
| Meeting link | https://bismanak.webex.com/bismanak/j.php?MTID=m1664974e0a2cc6db7707554ea2dffe4 |
| Meeting ID | 25106287173 |
| Password | 123456 |

Chairperson: Shri Mahesh Kulkarni, Senior Director (Corporate R&D) & HoD GIST CDAC

Member Secretary: Shri Kalluri.N.V.S.Chaitanya, Scientist 'C', BIS

ITEM 0 WELCOME

- 0.1** Welcome by the Member Secretary
- 0.2** Opening remarks by the Chairperson

ITEM 1 FORMAL CONFIRMATION OF THE MINUTES OF THE LAST MEETING

- 1.1** The minutes of the 12th meeting of "Coding And Processing of Audio, Picture, Multimedia and Hypermedia Information" sectional committee, LITD 23, which was held on 22nd April 2024, were circulated. No comments have been received.

THE COMMITTEE MAY FORMALLY CONFIRM THE MINUTES.

ITEM 2 SCOPE AND COMPOSITION COMMITTEE

- 2.1** The Scope and composition of LITD 23 is given in [Annex 1](#).
- 2.2** Liaison with ISO Committees
 - ISO/IEC JTC 1/SC 29 - Coding of audio, picture, multimedia and hypermedia information – Participating (P) Member
 - ISO/IEC JTC 1/SC 24 - Computer graphics, image processing and environmental data representation - Observer (O) Member

2.3 Co-option requests have been received from the following Organizations/Institutes:

- **Veermata Jijabai Technological Institute, Mumbai**– Mr. Rahul Ingle, Detailed CV is given in **Annex-2**

2.4 Co-option requests have been received from the following persons as individual capacity:

- Atul Kumar Dwivedi, Detailed CV is given in **Annex-2**
- Manish Okade, Detailed CV is given in **Annex-2**

2.3 Revised nominations from the organization(s).

- Mr. Anubhav Singh, Samsung Research and Development Institute India, Bangalore – Remove from committee as per the request of Samsung
- Dr. Neeraj Gadgil, Samsung Research and Development Institute India, Bangalore – Nominated as a member by Samsung, Detailed CV is attached in **Annex-2**

THE COMMITTEE MAY REVIEW THE SCOPE & COMPOSITION

ITEM 3 REVIEW OF PUBLISHED/UNDER DEVELOPMENT STANDARDS

3.1 Review of Published Standards

In accordance with BIS procedures, Indian Standards which are in existence for more than 3 years are to be reviewed for reaffirmation/revision/withdrawal. The committee may also review the following standards since it is due in 2024-25, the latest status along with international standard on which this is based is provided in **Annex-3**.

3.2 Draft Indian Standards under WC Draft

The following draft Indian standards are under WC-draft. The last date for comments of WC Draft was completed for all the below documents. No comments have been received for these documents.

| S.No | Document Number | Title |
|------|--|--|
| 1 | LITD/23/25552(Identical To: ISO/IEC 3721: 2023) | Information Technology Computer Graphics Image Processing and Environmental Data Representation Information Model For Mixed and Augmented Reality Content Core Objects and Attributes |
| 2 | LITD/23/25553(Identical To: ISO/IEC 21145: 2023) | Information Technology Computer Graphics Image Processing and Environmental Data Representation Style Representation for Mixed and Augmented Reality |
| 3 | LITD/23/25554(Identical To: ISO/IEC 23488: 2022) | Information Technology Computer Graphics Image Processing and Environment Data Representation ObjectEnvironmental Representation For Image-Based Rendering In VirtualMixed and Augmented Reality VRMAR |
| 4 | LITD/23/25555(Identical To: ISO/IEC TS 5147: 2023) | Information Technology Computer Graphics Image Processing and Environmental Data Representation Guidelines for Representation and Visualization of Smart Cities |
| 5 | LITD/23/25591(Identical To: ISO/IEC 18038:2020) | Information technology Computer graphics image processing and environmental representation Sensor representation in mixed and augmented reality |
| 6 | LITD/23/25592(Identical To: ISO/IEC 18039:2019) | Information technology Computer graphics image processing and environmental data representation Mixed and augmented reality MAR reference model |

| | | |
|---|---|--|
| 7 | LITD/23/25593(Identical To: ISO/IEC 18040:2019) | Information technology Computer graphics image processing and environmental data representation Live actor and entity representation in mixed and augmented reality MAR |
| 8 | LITD/23/25594(Identical To: ISO/IEC 18520:2019) | Information technology Computer graphics image processing and environmental data representation Benchmarking of vision-based spatial registration and tracking methods for mixed and augmented reality MAR |

3.3 Draft Indian Standards under F-Draft

The following draft Indian standards are under F-draft. The committee may kindly note.

| S.No | Document Number | Title |
|------|---|---|
| 1. | LITD/23/24385IS/ISO/IEC 14496 : Part 12: 2015(Identical To: ISO/IEC 14496-12: 2022) | Information Technology Coding of Audio-Visual Objects Part 12: ISO Base Media File Format |

THE COMMITTEE MAY DISCUSS & DECIDE

ITEM 4 PROGRAM OF WORK

4.1 The present program of work of LITD 23 is given in **Annex –4**

THE COMMITTEE MAY CONSIDER

ITEM 5 INTERNATIONAL STANDARDIZATION ACTIVITIES

5.1 Presently, LITD 23 acts as National Mirror Committee of following committees:

- ISO/IEC JTC 1/SC 29 - Coding of audio, picture, multimedia and hypermedia information – Participating (P) Member
- ISO/IEC JTC 1/SC 24 - Computer graphics, image processing and environmental data representation - Observer (O) Member

India is a P-member in ISO/IEC JTC 1/SC 29 and O-member in ISO/IEC JTC 1/SC 24 . Participating members have an obligation to vote and participate in international meetings and have access to all the IEC documents. ‘O’ members are observer members. They do not have any voting rights, also they cannot participate in international meetings. However, they have access to all the ISO/IEC documents.

5.2 List of standards published by ISO/IEC JTC 1/SC 29 and the list of standards in ISO/IEC JTC 1/SC 29 that are not mapped with Indian Standards, is given at **Annex-5**.

5.3 List of standards published by ISO/IEC JTC 1/SC 24 and the list of standards in ISO/IEC JTC 1/SC 24 that are not mapped with Indian Standards, are given at **Annex-6**.

5.4 Voting and comments for the upcoming ballots. List of all upcoming ballots is attached in **Annex-7**.

5.5 Status of the work of our experts in the working groups at international level. The list of working groups in each TC and SC and the experts associated with the working groups is attached in **Annex-8**.

5.6 Participation in working groups in ISO/IEC JTC 1/SC 24 for updating the membership of India in ISO/IEC JTC 1/SC 24.

Metaverse is an upcoming field in the world and the base technologies that are extensively used in Metaverse are computer graphics, image processing, virtual reality, augmented reality, and mixed reality, Block chain etc. In ISO/IEC JTC 1/SC 24 work is going on the standards pertaining to computer graphics, image processing, virtual reality, augmented reality, and mixed reality etc. In view of this Indian Standards may be useful to the stakeholders who are using the above technologies. For making good Indian Standards and also know the latest technological advancements participation of our experts in the working groups of ISO/IEC JTC 1/SC 24 is essential and this will also help India to be a P member in ISO/IEC JTC 1/SC 24 and the Indian vote for the ballots pertaining to these technologies will be taken into consideration by ISO.

5.6 Forthcoming ISO/IEC Plenary Meetings:

| Meeting | Date | Mode |
|---|--------------------|-------------|
| ISO/IEC JTC 1/SC 29 Plenary Meetings Genève (Switzerland) | 25-26 January 2025 | Hybrid |
| ISO/IEC JTC 1/SC 29 Plenary Meetings Daejeon (Korea, Republic of) | 05-06 July 2025 | Hybrid |
| ISO/IEC JTC 1/SC 24 Plenary Meetings United States | 07-11 July 2025 | Hybrid |

The agenda for the upcoming ISO/IEC JTC 1/SC 29 Plenary Meetings in Genève (Switzerland) is attached in **Annex-9**. The agenda for the upcoming ISO/IEC JTC 1/SC 29 Plenary Meetings Daejeon (Korea, Republic of) is attached in **Annex-10**. The agenda for the upcoming ISO/IEC JTC 1/SC 24 Plenary Meetings United States is attached in **Annex-11**.

THE COMMITTEE MAY NOTE

ITEM 6 NATIONAL STANDARDIZATION ACTIVITIES

6.1 NEW WORK ITEM PROPOSAL

6.1.1 New work item proposals (NWIP) have been proposed by MeitY. MeitY has requested to provide Standards on the below item.

| SN | Domain | Sub Domain | Indian Standards exist (Yes/No) | Name of Indian Standards (if Yes) | International Standards exist (Yes/No) | Name of International Standards (if Yes) | Remarks (including approval status of Indian Standards) | Levels of Priority (High/Medium/Low) |
|-----------|-----------------------------|-------------------|--|--|---|---|--|---|
| 1 | Natural Language Processing | Font Format | No | | Yes | ISO: Open Font Format ISO/IEC 14496-22 | Open Font Format is tightly coupled with Unicode/ISO 10646 | Low |

6.1.2 New work item proposals (NWIP) for the following title and scope have been proposed by Shri Priyanshu Sharma, LITD, Bureau of Indian Standards.

1. **Proposed Title:** Information technology Computer graphics image processing and environmental data representation Benchmarking of vision based spatial registration and tracking methods for mixed and augmented reality MAR

Proposed Scope: This document identifies the reference framework for the benchmarking of vision based spatial registration and tracking vSRT methods for mixed and augmented reality MAR The framework provides typical benchmarking processes, benchmark indicators and trial set elements that are necessary to successfully identify define design select and apply benchmarking of vSRT methods for MAR It also provides definitions for terms on benchmarking of vSRT methods for MAR In addition this document provides a conformance checklist as a tool to clarify how each benchmarking activity conforms to this document in a compact form by declaring which benchmarking processes and benchmark indicators are included and what types of trial sets are used in each benchmarking activity



Proposal 1.pdf

2. **Proposed Title:** Information technology Computer graphics image processing and environmental data representation Live actor and entity representation in mixed and augmented reality MAR

Proposed Scope: This document defines a reference model and base components for representing and controlling a single LAE or multiple LAEs in an MAR scene It defines concepts a reference model system framework functions and how to integrate a 2D 3D virtual world and LAEs and their interfaces in order to provide MAR applications with interfaces of LAEs It also defines an exchange format necessary for transferring and storing LAE related data between LAE based MAR applications This document specifies the following functionalities definitions for an LAE in MAR representation of an LAE representation of properties of an LAE sensing of an LAE in a physical world integration of an LAE into a 2D 3D virtual scene interaction between an LAE and objects in a 2D 3D virtual scene transmission of information related to an LAE in an MAR scene This document defines a reference model for LAE representation-based MAR applications to represent and to exchange data related to LAEs in a 2D 3D virtual scene in an MARs.



Proposal 2.pdf

3. **Proposed Title:** Information technology Computer graphics image processing and environmental data representation Mixed and augmented reality MAR reference model

Proposed Scope: This document defines the scope and key concepts of mixed and augmented reality the relevant terms and their definitions and a generalized system architecture that together serve as a reference model for mixed and augmented reality MAR applications, components systems services and specifications This architectural reference model establishes the set of required sub modules and their minimum functions the associated information content and the information models to be provided and or supported by a compliant MAR system The reference model is intended for use by current and future developers of MAR applications components systems services or specifications to describe, compare contrast and communicate their architectural design and implementation The MAR reference model is designed

to apply to MAR systems independent of specific algorithms implementation methods computational platforms display systems and sensors or devices used.



Proposal 3.pdf

4. **Proposed Title:** Information technology Computer graphics image processing and environmental representation Sensor representation in mixed and augmented reality

Proposed Scope: This document defines the framework and information reference model for representing sensor based 3D mixed reality worlds It defines concepts an information model architecture system functions and how to integrate 3D virtual worlds and physical sensors in order to provide mixed reality applications with physical sensor interfaces It defines an exchange format necessary for transferring and storing data between physical sensor based mixed reality applications This document specifies the following functionalities representation of physical sensors in a 3D scene definition of physical sensors in a 3D scene representation of functionalities of each physical sensor in a 3D scene representation of physical properties of each physical sensor in a 3D scene management of physical sensors in a 3D scene interface with physical sensor information in a 3D scene.



Proposal 4.pdf

5. **Proposed Title:** Information technology Computer graphics image processing and environment data representation Object environmental representation for image-based rendering in virtual mixed and augmented reality VR MAR

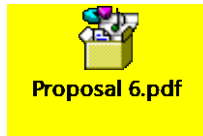
Proposed Scope: This document specifies an image-based representation model that represents target objects environments using a set of images and optionally the underlying 3D model for accurate and efficient objects environments representation at an arbitrary viewpoint. It is applicable to a wide range of graphic virtual reality and mixed reality applications which require the method of representing a scene with various objects and environments This document defines terms for image-based representation and 3D reconstruction techniques specifies the required elements for image based representation specifies a method of representing the real world in the virtual space based on image based representation specifies how visible image patches can be integrated with the underlying 3D model for more accurate and rich objects environments representation from arbitrary viewpoints specifies how the proposed model allows multi object representation provides an XML based specification of the proposed representation



Proposal 5.pdf

6. **Proposed Title:** Information technology Computer graphics image processing and environmental data representation Style representation for mixed and augmented reality

Proposed Scope: This document specifies Constructs for representing and specifying various augmentation and presentation styles While augmentations can be in modalities other than the visual e g aural haptic this work addresses the visual augmentation style only A model for how to associate the stylization constructs to the augmentation objects Specifically the MAR behavior object in ISO IEC 3721 is extended for this purpose Other miscellaneous functionalities and abstractions that support the stylization of augmentation objects



7. **Proposed Title:** Information technology Computer graphics image processing and environmental data representation Guidelines for representation and visualization of smart cities

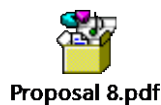
Proposed Scope: Describes the concepts of a smart city smart city object and smart city data describes categories of data associated with smart cities provides guidance for representation of smart cities describes guidance for visualization of smart cities provides guidance in selecting the appropriate representation and visualization technique for different categories of smart city data using standards and provides use cases for applying standards to the representation and visualization of smart cities



8. **Proposed Title:** Information technology Computer graphics image processing and environmental data representation Information model for mixed and augmented reality content Core objects and attributes

Proposed Scope: This document specifies the information model for representing the mixed and augmented reality (MAR) scene/contents description, namely, information constructs for:

- a) representing the virtual reality scene graph and structure such that a comprehensive range of mixed and augmented reality contents can also be represented;
- b) representing physical objects in the mixed and augmented reality scene targeted for augmentation;
- c) representing physical objects as augmentation to other (virtual or physical) objects in the mixed and augmented reality scene;
- d) providing ways to spatially associate aforementioned physical objects with the corresponding target objects (virtual or physical) in the mixed and augmented reality scene;
- e) providing other necessary functionalities and abstractions that will support the dynamic MAR scene description such as event/data mapping, and dynamic augmentation behaviours;
- f) describing the association between these constructs and the MAR system which is responsible for taking and interpreting this information model and rendering/presenting it out through the MAR display device.



9. **Proposed Title:** Information technology Coding of audio-visual objects Part 3: Audio First Revision

Proposed Scope: This document integrates many different types of audio coding natural sound with synthetic sound low bitrate delivery with high-quality delivery speech with music complex soundtracks with simple ones and traditional content with interactive and virtual reality content. This document standardizes individually sophisticated coding tools to provide a novel flexible framework for audio synchronization mixing and downloaded postproduction.



10. **Proposed Title:** Information technology - Computer graphics and image processing - Graphical Kernel System GKS Part 1: Functional description
Proposed Scope: This part of ISO IEC 7942 specifies a set of functions for Computer graphics programming, the Graphical Kernel System (GKS). It provides functions for two-dimensional graphical output, the storage and dynamic modification of pictures, and Operator input. GKS functions and data types are specified independently of programming languages.



Proposal 10.pdf

11. **Proposed Title:** Storing JPEG images in DNA-based Data Storage Systems (JPEG DNA Exploration)
Proposed Scope: Development of an indigenous and efficient codec architecture to store JPEG in DNA with successful retrieval of the reconstructed images. Testing and optimization of the indigenous solution over several simulations on different parameters. Study of different DNA storage simulators and find out the relevant parameters suitable for simulating the JPEG DNA storage.



Proposal 11.pdf

12. **Proposed Title:** Information technology - Computer graphics and image processing - Graphical Kernel System GKS Part 3: Audit trail
Proposed Scope: This part of ISO IEC 7942 provides a file format for capturing the sequence of GKS functions and their parameters invoked by an application, for subsequent playback.



Proposal 12.pdf

13. **Proposed Title:** Information technology - Computer graphics and image processing - Graphical Kernel System GKS Part 4: Picture part archive
Proposed Scope: This part of ISO IEC 7942 provides a file format and encodings for the storage and retrieval of GKS -94 picture parts. It is based on Part 2 of ISO IEC 7942 the NDC metafile, which is itself an extension of the Computer Graphics Metafile, Version 4 defined by ISO IEC 8632:1992 Amd 2: 1995 (all Parts)



Proposal 13.pdf

14. **Proposed Title:** Information technology - Computer graphics and image processing - Graphical Kernel System GKS Part 2: NDC metafile
Proposed Scope: This part of ISO IEC 7942 provides a file format and encodings for the storage and retrieval of GKS -94 Normalized Device Coordinate (NDC) pictures. It is an extension of the Computer Graphics Metafile, Version 4 defined by ISO IEC 8632 : 1992, AMD 2 :1995 (All Parts)



Proposal 14.pdf

15. **Proposed Title:** Information Technology - Coding of Audio-Visual Objects Part 12 ISO Base Media File Format
Proposed Scope: This Part of ISO IEC 14496 specifies the ISO base media file format, which is a general format forming the basis for a number of other more specific file formats. This

format contains the timing, structure, and media information for timed sequences of media data, such as audio- visual presentations.



Proposal 15.pdf

16. **Proposed Title:** Information Technology - Coding of Audio-Visual Objects Part 10
Advanced Video Coding

Proposed Scope: This Part of ISO IEC 14496 specifies the ISO base media file format, which is a general format forming the basis for a number of other more specific file formats. This format contains the timing, structure, and media information for timed sequences of media data, such as audio- visual presentations.



Proposal 16.pdf

THE COMMITTEE MAY DELIBERATE AND DECIDE

ITEM 7 Guidelines on Research Projects

7.1 Introduction

BIS has issued Guidelines for Research & Development Projects for Formulation and Review of Standards. The Objectives of this Scheme are to:

- A. Support and commission R&D projects to generate knowledge, empirical data and insights that would help in formulating new standards and updating & upgrading the existing Indian standards.
- B. Expand the network of domain area experts to carryout R&D projects in the areas related to standardization and conformity assessment; and
- C. Enrich the research ecosystem in the educational institutions imparting technical and professional education.

BIS will publish a list of research & development projects along with Terms of Reference (ToR) on Standardization portal or any other suitable digital platform.

- 7.2 The current guidelines for R&D projects for establishments/revision of Indian Standards are given below:



R&D
Guidelines.pdf



Template for
ToR.pdf

THE COMMITTEE MAY PLEASE NOTE

ITEM 8 DATE AND PLACE FOR THE NEXT MEETING

ITEM 9 ANY OTHER BUSINESS

Annex-1

Scope: To prepare Indian Standards relating to:

- a. Coded representation of audio, picture, multimedia and Hypermedia information and sets of compression and control functions for use with such information
- b. Interfaces for information technology-based applications relating to computer graphics and image processing

Committee Composition

| S.No. | Organization | Member Name | Role |
|-------|---|--------------------------|------------------|
| 1 | IN PERSONAL CAPACITY | Shri Mahesh Kulkarni | Chairperson |
| 2 | AMD India Private Limited - Gurgaon | Mahesh Narain Shukla | Principal Member |
| 3 | AMD India Private Limited - Gurgaon | Vijay Kumar Bansal | Alternate Member |
| 4 | AMD India Private Limited - Gurgaon | Pankaj Kumar Bansal | Alternate Member |
| 5 | Amazon India, Bengaluru | Malateshgouda Karegoudar | Principal Member |
| 6 | Broadcast Engineering Consultants India Limited, New Delhi | Khushwinder Singh Bhatia | Principal Member |
| 7 | Broadcast Engineering Consultants India Limited, New Delhi | Avinash Khanna | Alternate Member |
| 8 | Broadcast Engineering Consultants India Limited, New Delhi | Pooja Srivas | Alternate Member |
| 9 | Broadcast Engineering Consultants India Limited, New Delhi | Padarabinda Das | Alternate Member |
| 10 | Centre for Development of Advanced Computing, Pune | Shri Vivek Khaneja | Principal Member |
| 11 | Consumer Electronics and Appliances Manufacturers Association, Noida | Shri Mohit Verma | Principal Member |
| 12 | Consumer Electronics and Appliances Manufacturers Association, Noida | Ravi Shankar Chaudhary | Alternate Member |
| 13 | Consumer Electronics and Appliances Manufacturers Association, Noida | Anil Mehta | Alternate Member |
| 14 | Consumer Electronics and Appliances Manufacturers Association, Noida | Saurabh Kumar Singh | Alternate Member |
| 15 | Dhirubhai Ambani Institute of Information and Communication Technology, Gandhinagar | Prof. Manish K Gupta | Principal Member |
| 16 | Directorate General Doordarshan, Prasar Bharti, New Delhi | D.Godwin Gananaraj | Alternate Member |
| 17 | Directorate General Doordarshan, Prasar Bharti, New Delhi | Rajesh Jain | Principal Member |

| | | | |
|----|---|--------------------------------|--------------------|
| 18 | Dolby Technology India Private Limited, Mumbai | Rajesh Bhat | Alternate Member |
| 19 | Dolby Technology India Private Limited, Mumbai | Jayant Shah | Principal Member |
| 20 | Dolby Technology India Private Limited, Mumbai | Ashok Kumar Bhatnagar | Alternate Member |
| 21 | Fraunhofer Office India, Bengaluru | Ms. Anandi Iyer | Principal Member |
| 22 | Fraunhofer Office India, Bengaluru | Sharadindoo Sadhu | Alternate Member |
| 23 | Indian Institute of Information Technology, Allahabad | Mohammed Javed | Principal Member |
| 24 | Indian Institute of Technology Gandhinagar, Gandhinagar | Shanmuganathan Raman | Principal Member |
| 25 | Indian Institute of Technology Kanpur, Kanpur | Prof Vipul Arora | Principal Member |
| 26 | Instrive Softlabs Private limited, Chennai | Ashok | Principal Member |
| 27 | Instrive Softlabs Private limited, Chennai | Madhuvarshitt | Alternate Member |
| 28 | Ittiam Systems Private Limited, Bengaluru | Shri Murali Babu Muthukrishnan | Principal Member |
| 29 | Ittiam Systems Private Limited, Bengaluru | Shailesh Ramamurthy | Alternate Member |
| 30 | Ittiam Systems Private Limited, Bengaluru | Jeeva Raj | Young Professional |
| 31 | Ittiam Systems Private Limited, Bengaluru | Jay N. Shingala | Alternate Member |
| 32 | Ittiam Systems Private Limited, Bengaluru | Mukund Srinivasan | Alternate Member |
| 33 | Ministry of Electronics and Information Technology, New Delhi | Asha Nangia | Principal Member |
| 34 | PeopleLink Unified Communications Private Limited, Hyderabad | Ashokan | Alternate Member |
| 35 | PeopleLink Unified Communications Private Limited, Hyderabad | Mayank Asher | Principal Member |
| 36 | PeopleLink Unified Communications Private Limited, Hyderabad | Abhishek Pratap Singh | Alternate Member |
| 37 | Samsung Research and Development Institute India, Bangalore | Shri Raj Narayana Gadde | Alternate Member |
| 38 | Samsung Research and Development Institute India, Bangalore | Balvinder Singh | Principal Member |
| 39 | Samsung Research and Development Institute India, Bangalore | Anubhav Singh | Alternate Member |